

### Claims

1. Apparatus, comprising:  
a needle hub having a longitudinal axis and a needle extending from one of its ends;  
a collar rotatably mounted about said needle hub; and  
a needle sheath removably attached to said collar for covering said needle extending from said needle hub prior to its use.
2. Apparatus of claim 1, further comprising:  
a housing connected to said collar and pivotable to a position substantially in alignment along said longitudinal axis of said needle hub for covering said needle after said needle sheath is removed from said collar.
3. Apparatus of claim 2, further comprising a syringe having a luer end, said needle hub being mated to said syringe at other of its ends, said housing having at least one internal spline coactable with at least one catch at said hub to facilitate the separation of said needle hub from said syringe after said housing has been pivoted to said position to cover said needle.
4. Apparatus of claim 1, wherein said needle sheath comprises at least one internal spline and wherein said needle hub has at least one slot to which said spline is fitted when said sheath is attached to said collar so that said hub is rotatable with rotation of said sheath.
5. Apparatus of claim 2, wherein said housing has a longitudinal opening formed by first and second lips each extending along substantially the length of said housing, said first lip overlapping a portion of said second lip with said opening being off centered from said longitudinal axis, each of said lips being angled toward the

interior of said housing with the respective angles of said lips being varied along the length of said housing to effect a guide for said needle to smoothly enter into said housing at an angle through said opening when said housing is pivoted to cover said needle, said needle not removable from said housing once said needle fully enters into said housing.

6. Apparatus of claim 1, wherein said needle hub comprises a proximal portion and a distal portion, at least one and other flanges extending transversely from said proximal portion, said one and other flanges spaced apart from each other along the length of said proximal portion, a number of arms extending transversely from the distal portion of said needle hub for forming at least one slot for coaction with a spline integral of said needle sheath and a catch for coaction with a spline integral of a housing pivotable from said collar when said housing is pivoted to cover said needle.

7. Apparatus of claim 6, wherein said proximal portion of said needle hub has a luer end for mating to a syringe and said distal portion of said needle hub has a neck to which said needle attachedly extends.

8. Apparatus of claim 1, wherein said collar comprises at least one protrusion at a proximal portion of its interior surface for fitting within a space formed by spaced flanges extending transversely from a proximal portion of said needle hub, said collar rotatable about said needle hub when said protrusion is fitted within said space, said collar further comprising at least one finger at a distal portion of its interior surface to engage with a rim at the open end of said needle sheath so that once engaged, said needle sheath is removably attached to said collar.

9. Apparatus of claim 2, wherein said collar has formed at its outer surface a first lock mechanism and wherein said housing has formed at its proximal end a second lock mechanism, said first and second lock mechanisms coacting to fixedly retain said housing to said collar once said housing is pivoted to said position to cover said needle.

10. Apparatus of claim 9, wherein said first lock mechanism comprises at least one one way catch member extending from the outer surface of said collar, and said second lock mechanism comprises at least one corresponding aperture at said housing, said one way catch member matingly coupled to said aperture for fixedly retaining said housing to said collar when said housing is pivoted to cover said needle.

11. Needle protection apparatus, comprising a collar having pivotally attached thereto a housing, said housing having a longitudinal opening formed by first and second lips each extending substantially along the length of said housing, said first lip overlapping a portion of said second lip with said opening being off centered, each of said lips being angled toward the interior of said housing with the respective angles of each of said lips being varied along the length of said housing, said collar rotatably mounted about a needle hub having a needle extending therefrom, wherein when said housing is pivotally moved relative to said collar to cover said needle, said needle is guided by said lips to smoothly enter into said housing, said needle not removable from said housing once said needle has fully entered into said housing.

12. Needle protection apparatus of claim 11, wherein said collar comprises a proximal portion and a distal portion, a plurality of protrusions formed at the interior surface of said proximal portion of said collar for fitting within a space defined by spaced flanges extending transversely from a proximal portion of said needle hub,

said collar rotatable about said needle hub when said protrusions are fitted within said space, said collar further comprising a plurality of fingers at said distal portion of its interior surface to engage a rim at the open end of a needle sheath removably coupled to said collar to cover said needle prior to use, said needle sheath being removable from said collar when said needle is to be used.

13. Needle protection apparatus of claim 11, wherein said collar has formed at its outer surface at least two catch members and wherein said housing has formed at its proximal end at least two corresponding apertures, said catch members matingly coupled to said apertures to fixedly retain said housing to said collar once said housing is pivoted to cover said needle.

14. A needle hub comprising a proximal portion and a distal portion, first plurality and second plurality of flanges transversely extending circumferentially from said proximal portion, said first and second plurality of flanges being spaced apart to define a circumferential space at said proximal portion of said needle hub, sets of arms extending transversely from the distal portion of said needle hub for forming at least one slot for coaction with a needle sheath coupled to a collar rotatably mounted about said needle hub for covering a needle extending from said needle hub prior to use and at least one catch for coaction with a housing pivotable from said collar to cover said needle after the removal of said sheath from said collar.

15. Needle hub of claim 14, wherein the side of each flange of one of said first and second plurality of flanges to which said collar is press fitted against for mounting to said needle hub is beveled to ease the fitting of said collar to said needle hub, said collar being retained at but rotatable about the space defined by said first and second plurality of flanges once it is press fitted past the beveled flanges.

16. Needle hub of claim 14, wherein said needle hub comprises a luer end at its proximal portion for mating to a syringe.

17. In combination, a needle hub having a proximal portion and a distal portion, a needle extending from said distal portion of said hub along a longitudinal axis of said hub, a collar rotatably mounted about said needle hub, said collar having at the inner surface of its distal portion at least one retainer for removably retaining a needle sheath attached to said collar for covering said needle prior to its use, a housing having an off centered longitudinal opening connected to said collar and pivotable to a position substantially in alignment along said longitudinal axis for covering said needle after removal of said needle sheath from said collar.

18. Combination of claim 17, wherein said needle hub comprises flange means provided at said proximal portion for retaining said collar and a slot provided at said distal portion, said needle sheath having at least one internal spline that fits into said slot so that said needle hub may be threadingly coupled to a luer of a syringe by rotating said needle sheath.

19. Combination of claim 18, wherein said needle hub further comprises a catch provided at said distal portion, said housing having an internal spline that coacts against said catch after said housing has been pivoted to cover said needle so that said needle hub is rotated in synchronization with the rotation of said housing, said needle hub removable from a luer end of a syringe to which it is coupled by rotating said housing.

20. Combination of claim 18, wherein said flange means comprises two sets of spaced apart flanges on the proximal portion of said needle hub, and wherein said collar has at the inner surface of its proximal portion a plurality of protrusions, said

protrusions fitting between said spaced apart flanges when said collar is fitted about said needle hub, said collar rotatable about said needle hub.

21. Combination of claim 17, wherein said opening along said housing is formed by first and second lips each extending substantially along the length of said housing, said first lip overlapping a portion of said second lip with said opening being off centered, each of said lips being angled toward the interior of said housing with the respective angles of said lips being varied along the length of said housing, wherein when said housing is pivotally moved relative to said collar to cover said needle, said needle is guided by said lips to smoothly enter into said housing, said needle not removable from said housing once said needle has fully entered into said housing.

22. Combination of claim 17, wherein said collar has formed at its outer surface at least two catch members and wherein said housing has formed at its proximal end at least two corresponding apertures, said catch members matingly coupled to said apertures to fixedly retain said housing to said collar when said housing is pivoted to said longitudinal axis to cover said needle.

23. A method of making a medical needle assembly, comprising the steps of:

- a) providing a needle hub having a proximal portion and a distal portion;
- b) extending a needle from said distal portion of said hub;
- c) rotatably mounting a collar about said needle hub, said collar having at the inner surface of its distal end at least one retainer; and
- d) attaching a needle sheath to said collar for covering said needle prior to its use, said needle sheath being retained by said retainer.

24. Method of claim 23, further comprising the steps of:  
connecting a housing to said collar; and  
effecting an off centered longitudinal opening substantially along the length of said housing, said housing pivotable to a position substantially in alignment along the longitudinal axis of said needle hub for covering said needle after removal of said needle sheath from said collar.
25. Method of claim 23, wherein said step a comprises the steps of:  
integrating at least one and other flanges transversely to said proximal portion of said needle hub;  
spacing said one and other flanges apart from each other along the length of said proximal portion;  
beveling the side of each of the flanges to which said collar is to be press fitted against for easing the fitting of said collar onto said needle hub; and  
extending a number of arms transversely from the distal portion of said needle hub for forming at least one slot for coaction with an integral spline of said needle sheath and a catch for coaction with an integral spline of a housing pivotable from said collar to cover said needle.
26. Method of claim 23, further comprising the steps of:  
forming a plurality of protrusions at the interior surface of a proximal portion of said collar; and  
forming a plurality of retainers at the interior surface of a distal portion of said collar;  
wherein said step c comprises the step of:  
press fitting said collar to said needle hub by fitting said protrusions to a space defined by spaced flanges extending transversely from a proximal portion of said

needle hub, said collar rotatable about said needle hub when said protrusions are fitted into said space; and

wherein said step d comprises the step of:

engaging a rim at the open end of said needle sheath with said retainers of said collar for removably coupling said needle sheath to said collar to cover said needle prior to its use.

27. Method of claim 24, further comprising the steps of:

forming at the outer surface of said collar at least one catch member; and

forming at a proximal end of said housing at least one corresponding aperture;

wherein said catch member matingly couples to said aperture to fixedly retain said housing to said collar when said housing is pivoted to said longitudinal axis to cover said needle.

28. Method of claim 24, wherein the effecting step further comprising the steps of:

effecting along substantially the length of said housing first and second lips for forming said longitudinal opening ;

overlapping a portion of said first lip over said second lip to effect said off centered opening; and

angling each of said lips toward the interior of said housing with the respective angles of said lips being varied along the length of said housing to enable said lips to smoothly guide said needle through said opening into said housing when said housing is pivoted to cover said needle, said needle not removable from said housing once said needle fully enters into said housing.